

Email and telephone redacted

LinkedIn: www.linkedin.com/in/priyasaxena0929ResearchGate: <https://www.researchgate.net/profile/Priya-Saxena-4>

Priya Saxena

PROFESSIONAL SUMMARY

- Self-motivated biotechnologist with a strong background in **anaerobic-microbial culturing**, **biofilm culturing** on metallic and non-metallic surfaces using **CDC biofilm reactor**, **nanopore sequencing** (whole genomics, metagenomics, epigenetics and transcriptomics), **omics data analysis**, **microbiology**, **molecular biology/ genetics**, **analytical instrumentation** (chromatography), **high content imaging** (microscopy), **visualization software** (Tableau, Origin, and GraphPad Prism).
- Proven record of 11 **peer-reviewed published articles**, 2 book chapters, and **mentored** 5 graduate and undergraduate students.
- Designed **transcriptomics pipelines**, putative **biochemical pathways**, devised **solvent-extraction protocols**, and **taught graduate courses** (microbiology and bioinformatics).

EDUCATION

South Dakota School of Mines & Technology (SDSM&T)
Doctor of Philosophy (Ph.D.), Chemical and Biological Engineering (3.80 GPA)

Rapid City, SD
 May 2025

South Dakota School of Mines & Technology (SDSM&T)
Master of Science (M.S.), Chemical Engineering (3.80 GPA)

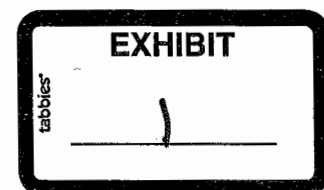
Rapid City, SD
 May 2025

Jaypee University of Information & Technology (JUIT)
Bachelor of Technology (B. TECH), Biotechnology (3.28 GPA)
Thesis: Effective alkaline metal-catalyzed oxidative delignification of wheat straw.

Solan, HP, India
 August 2019

RESEARCH EXPERTISE

- Environmental Microbiology- Anaerobic sulfate reduction and Biofilms
- Computational Biology and Omics (data analysis)
- DNA and RNA library preparation via Nanopore (MinION)
- Biopolymer Extraction and Characterization (PHA and EPS)
- GC-MS-based AHL identification
- Molecular biology- Enzyme tailoring
- Analytical Instrumentations



WORK EXPERIENCE

Ph.D. (January 2020- May 2025)

SDSM&T, Rapid City, SD

- Streamlined purification protocols for nucleic acids (RNA and DNA) extraction from anaerobic cultures and biofilms grown on metallic surfaces.
- Performed transcriptomics, and designed data analysis pipelines to elucidate stress coping mechanism of sulfate-reducing bacteria (SRB) grown under different copper concentrations.
- Performed transcriptomics for SRB biofilms grown on both metallic and non-metallic surfaces.
- Performed RT-PCR to study the gene expression profile of SRB under varying pH stresses.

- Extracted extracellular polymeric substances (EPS) from SRB under varying pH and performed characterization using chemical assays and analytical instrumentation.
- Experienced with CDC bioreactor and anaerobic chamber for cultivation of SRB biofilm.
- Gained hands-on experience in developing and maintaining Standard Operating Procedures (SOPs) for NanoIR3, ensuring precise AFM and IR characterization of biofilms and corroded surfaces.
- Performed and acquired hands-on experience in single-cell genomics of *Oleidesulfovibrio alaskensis* G20 biofilms grown on copper and 2D-coated copper surfaces using the 10x Genomics Controller.
- Identified acyl homoserine lactones in SRB and devised chemical extraction protocols for subsequent analysis using GC-MS.
- Identified 63 essential genes in *Oleidesulfovibrio alaskensis* G20 using feedback loop framework with the aid of comparative genomics (pangenome) and python based automated curation.
- Operated a 40-liter reactor, which supported in the scale-up process for the production of extracellular polymeric substances.
- Applied expertise in method development, transfer, qualification, and validation to establish and maintain SOPs for Bioanalyzer and anaerobic chamber (KOY lab.), ensuring robust quality control standards for anaerobic SRB cultures.
- Performed Scanning Electron Microscopy (SEM) and Confocal Laser Scanning Microscopy (CLSM) to visualize the SRB biofilm.
- Reported highest laccase enzyme activity (6.02 IU/mg) from *Geobacillus* sp. WSUCF1 (adaptive evolution under lignocellulosic biomass) using ABTS method.
- Worked with my supervisor in writing grants and proposals.

Graduate Teaching Assistant: (May 2022- May 2025)

SDSM&T, Rapid City, SD

- Taught and managed undergraduate lab sections for General Biology Lab I and II, delivering lectures, supervising hands-on lab experiments, mentoring students, and evaluating their performance through assessments and grading.
- Mentored graduate students in the Microbiology Lab, facilitating their comprehensive understanding of essential principles and techniques, including plating, spreading, streaking, handling microbial culture, gram staining, antibiotic susceptibility tests, preparing slants and stubs and glycerol stocks for microbial culture preservation.
- Designed and implemented an advanced module for analyzing raw transcriptomics data acquired through Illumina sequencing in a graduate-level Bioinformatics class. This module aims to equip students with both theoretical and practical knowledge of essential tools, including FastQC, MultiQC, Trimmomatic, HISAT2, FeatureCounts, and DeSeq2.
- Assisted students in data analysis, interpretation, and the preparation of comprehensive scientific reports.

Bachelor of Technology (B. Tech): (June 2016- August 2019)

JUIT, HP, India

Research Project: Effective alkaline metal-catalyzed oxidative delignification of wheat straw.

- Fed-batch, two-stage Cu-AHP pretreatment process was effective in pretreating wheat straw biomass.
- Thermostable xylanase was produced from thermophilic bacteria *Geobacillus thermodenitrificans* X1 to be further used for hydrolysis of the pretreated biomass.

Research Project: [PUC18 Vector Transformation and Recombinant DNA Validation]

- Standardized a transformation protocol for the PUC18 vector, followed by the construction of recombinant DNA containing an unknown gene inserted into PUC18. Subsequently, performed cloning, screening, and confirmation procedures to validate the results.
- Implemented Blue-White screening method for determining the transformed cells.

Research Project: [Production of bioethanol from vegetable peels.]

- Collected and pulverized vegetable peels derived from household wastes.

TECHNICAL SKILLS

Key Skills

Transcriptomics and Genomic Data Analysis | Statistical Analysis | Solvent-extraction | Sequencing library preparation | Enzyme assays | Enzyme characterization

Other Software

Galaxy | Discovery Studio | ASPEN PLUS | StatEase | MS-Excel | COMSOL | Tableau | GraphPad Prism | Origin | MS-Word | MS-PowerPoint | MS-Access

Instrumentation

Nanopore sequencer (MiNION) | Gas-chromatography (MS) | Bioreactor | AFM | FT-IR | PCR | HPLC | SEM | IC-MS | CLSM | Electrophoresis | RT-PCR | UV-Vis

INTERNSHIPS

SDSM&T: (February 2019- August 2019)

Rapid City, SD, USA

- Implemented 15 rounds of evolutionary adaptation in *Geobacillus* sp. WSUCF1, inducing laccase expression without preprocessing for unprocessed lignocellulose.
- Achieved a 20-fold increase in catalytic laccase activity, reaching 9.23 ± 0.6 U/mL in a stable, adapted strain, compared to the initial 0.46 ± 0.04 U/mL from the wild strain on unprocessed corn stover.
- Trained and supervised high school teachers on laboratory protocols.

Allele Life Sciences: (June 2018- July 2018)

Noida, UP, India

- Conducted gene expression profiling of the tumor suppressor gene WT1 through Real-Time PCR, gaining expertise in RNA extraction and cDNA synthesis for the cell line. Additionally, executed Real-Time PCR analysis using SYBR green, designed primers, and a housekeeping gene for precise quantification of mRNA expression of the WT1 tumor suppressor gene.
- Gained hands-on experience in various bioinformatics tools, software, and techniques to contribute effectively to multiple projects.

Central Research Institute: (June 2017- July 2017)

Kasauli, HP, India

- Attended basic laboratory training and get familiar with: Quality control, Quality assurance, diagnostics, polio and influenza laboratory techniques.
 - Attended National Salmonella and Escherichia center and water utility workshop.
 - Monitored and documented safety standards to verify compliance.
-

PUBLICATIONS

❖ Peer-reviewed journal publications (Published, as of January 2025) [12]

1. **Saxena P**, Samanta D, Thakur P, Goh KM, Subramaniam M, Peyton BM, Fields M, Sani RK. pH-dependent genotypic and phenotypic variability in *Oleidesulfovibrio alaskensis* G20. Appl Environ Microbiol 0:e02565-24. 2025 Mar 26. (IF: 3.9)
2. Gopalakrishnan, V., **Saxena, P.**, Thakur, P., Lipatov, A. and Sani, R.K., 2024. Impact of Graphene Layers on Genetic Expression and Regulation within Sulfate-Reducing Biofilms. *Microorganisms*, 12(9), p.1759. <https://www.mdpi.com/journal/microorganisms> (IF: 4.1)
3. Thakur, P., Gopalakrishnan, V., **Saxena, P.**, Subramaniam, M., Goh, K.M., Peyton, B., Fields, M. and Sani, R.K., 2024. Influence of Copper on *Oleidesulfovibrio alaskensis* G20 Biofilm Formation. *Microorganisms*, 12(9), p.1747. <https://doi.org/10.3390/microorganisms12091747> (IF: 4.1)
4. Samanta, D., Rauniyar, S., **Saxena, P.**, & Sani, R. K. (2024). From genome to evolution: investigating type II methylotrophs using a pangenomic analysis. *Msystems*, e00248-24. <https://doi.org/10.1128/msystems.00248-24> (IF: 6.4)

5. Saxena, P., Krumholz, L., Govil, T., and Sani, R. K. (2024). Genetical and Biochemical Basis of Methane Monooxygenases of *Methylosinus trichosporium* OB3b in Response to Copper. *Methane*, 3(1), 103-121. <https://doi.org/10.3390/methane3010007> (New journal)
6. Saxena, P., Rauniyar, S., Thakur, P., Singh, R. N., Bomgni, A., Alaba, M. O., and Sani, R. K. (2023). Integration of text mining and biological network analysis: Identification of essential genes in sulfate-reducing bacteria. *Frontiers in Microbiology*, 14, 1086021. <https://doi.org/10.3389/fmicb.2023.1086021> (IF: 4.0)
7. Tripathi, A. K., Samanta, D., Saxena, P., Thakur, P., Rauniyar, S., Goh, K. M., and Sani, R. K. (2023). Identification of AHL Synthase in *Desulfovibrio vulgaris* Hildenborough Using an In-Silico Methodology. *Catalysts*, 13(2), 364. <https://doi.org/10.3390/catal13020364> (IF: 3.8)
8. Thakur, P., Alaba, M. O., Rauniyar, S., Singh, R. N., Saxena, P., Bomgni, A., and Sani, R. K. (2023). Text-mining to identify gene sets involved in biocorrosion by sulfate-reducing bacteria: A Semi-Automated Workflow. *Microorganisms*, 11(1), 119. <https://www.mdpi.com/2076-2607/11/1/119> (IF: 4.1)
9. Samanta, D., Govil, T., Saxena, P., Gadhamshetty, V., Krumholz, L. R., Salem, D. R., and Sani, R. K. (2022). Enhancement of Methane Catalysis Rates in *Methylosinus trichosporium* OB3b. *Biomolecules*, 12(4), 560. <https://doi.org/10.3390/biom12040560> (IF: 4.8)
10. Tripathi, A.K., Saxena, P., Thakur, P., Rauniyar, S., Samanta, D., Gopalakrishnan, V., Singh, R.N. and Sani, R.K. (2022). Transcriptomics and functional analysis of copper stress response in the sulfate-reducing bacterium *Desulfovibrio alaskensis* G20. *International Journal of Molecular Sciences*, 23(3), p.1396. <https://doi.org/10.3390/ijms23031396> (IF: 4.9)
11. Tripathi, A. K., Thakur, P., Saxena, P., Rauniyar, S., Gopalakrishnan, V., Singh, R. N., and Sani, R. K. (2021). Gene sets and mechanisms of sulfate-reducing bacteria biofilm formation and quorum sensing with impact on corrosion. *Frontiers in microbiology*, 12, 754140. <https://doi.org/10.3389/fmicb.2021.754140> (IF: 4.0)
12. Govil, T., Saxena, P., Samanta, D., Singh, S. S., Kumar, S., Salem, D. R., and Sani, R. K. (2020). Adaptive enrichment of a thermophilic bacterial isolate for enhanced enzymatic activity. *Microorganisms*, 8(6), 871. <https://doi.org/10.3390/microorganisms8060871> (IF: 4.1)

❖ Book Chapters (Published, as of January 2025) [2]

1. Gopalakrishnan, V., Singh, R. N., Tripathi, A. K., Rauniyar, S., Saxena, P., Thakur, P., & Sani, R. K. (2023). Biochemical and molecular mechanisms of sulfate-reducing bacterial biofilms. In *Understanding Microbial Biofilms* (pp. 165-172). Academic Press.
2. Samanta, D., Govil, T., Saxena, P., Thakur, P., Narayanan, A., and Sani, R. K. (2022). Extremozymes and their applications. In *Extremozymes and their Industrial Applications* (pp. 1-39). Academic Press.

❖ Under Review (as of February 2025) [2]

1. Saxena, P., and Sani, R.K. (2024). Transcriptomics profiling of *Oleidesulfovibrio alaskensis* G20 biofilm grown on copper and polycarbonate. *Biofilms- Elsevier*.
2. Samanta, D., Saxena, P., Thakur, P., and Sani, R.K. Progress in decoding the functional landscape of hypothetical proteins. *Biotechnology Advances*.

PRESENTATIONS | CONFERENCES [6]

1. Saxena, P., and Sani, R. K. (2024, August). Delineating the influence of pH on the genotypic and phenotypic variations of *Oleidesulfovibrio alaskensis* G20. NSF EPSCOR 28th National Conference, Omaha, NE, USA.
2. Saxena, P., and Sani, R. K. (2024, August). Delineating the influence of pH on the genotypic and phenotypic variations of *Oleidesulfovibrio alaskensis* G20. Society for Industrial Microbiology and Biotechnology, Boston, MA, USA
3. Saxena, P., and Sani, R. K. (2024, May). Delineating the influence of pH on the genotypic and phenotypic variations of *Oleidesulfovibrio alaskensis* G20. Conference on Science at Sanford Underground Research Facility, SD Mines, SD, USA
4. Saxena, P., and Sani, R. K. (2023, May). Transcriptomics and functional analysis of copper stress response in the sulfate-reducing bacterium *Oleidesulfovibrio alaskensis* G20. Mole Day Symposium, SD Mines, SD, USA
5. Saxena, P., and Sani, R. K. (2022, May). Transcriptomics and functional analysis of copper stress response in the sulfate-reducing bacterium *Oleidesulfovibrio alaskensis* G20. Conference on Science at Sanford Underground Research Facility, SD Mines, SD, USA

WORKSHOPS ATTENDED [3]

1. Ion Chromatography, 12 th September 2023, SDSMT, Rapid City, SD, USA
 2. Single-cell omics, 17 th – 18 th July 2024, SDSMT, Rapid City, SD, USA
 3. NanoIR3, 29 th March 2024, SDSMT, Rapid City, SD, USA
-